

western species near the limits of their respective ranges occupying closely similar habitat niches.

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NOTES ON THE LUNG MITES OF PRIMATES (ACARINA: DERMANYSIIDAE), INCLUDING THE DESCRIPTION OF A NEW SPECIES.

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Lung mites of primates occur, so far as known, exclusively in Old World hosts. They infest the bronchial tubes and tracheae and cause tubercular growths that have been mistaken for tuberculosis nodules. The injury produced by these mites has been well summarized by Helwig (1925), who reported upon six cases of infestation of the lungs. He states that the acarids produced pulmonary lesions that were at first mistaken for those of tuberculosis. According to this writer three of the infested monkeys were subject "to very frequent attacks of paroxysmal coughing and sneezing which we attributed to the arachnid infection."

Our first knowledge of these mites dates from the publication of a paper by Haan and Grijns in 1901 in which they include Banks's description of the first reported species, which species was placed in a new genus. These authors state: "Dr. N. Banks determiniert und als *Pneumonyssus simicola* n. g., n. sp. beschrieben worden sind. Wir entnehmen seiner Veröffentlichung folgendes \* \* \*." Then the description follows in

quotation marks. It is evident that the genus *Pneumonyssus* and also its one included species, *simicola*, should be attributed to Banks rather than to Haan and Grijns. Since this first description was published a number of papers have appeared dealing with the biology, taxonomy, or economy of lung mites of monkeys. Included in these papers are the descriptions of four forms that were considered as new species.

Recently the writer has received two lots of lung mites for study, one of them coming from a Rhesus monkey in this country and one from the dog-faced baboon in the Belgian Congo. A study of these two lots showed some striking differences between them, and when the characters of other described species were taken into consideration it appeared that most of these differences existed between those species occurring in hosts from the Ethiopian Region and those occurring in hosts belonging to the Oriental Region. Also it seems that some of the species described as new should be regarded as synonyms.

In order to give a summary of the known species in the briefest possible manner a table is here presented that is self explanatory:

TABLE OF SPECIES OF LUNG MITES OF PRIMATES.

NAME OF MITE.	TYPE HOST.	TYPES COLLECTED IN.	REMARKS.
<i>Pneumonyssus simicola</i> Banks (1901)	<i>Cynocephalus</i> sp.	Java	Described in paper by Haan & Grijns.
<i>Pneumonyssus duttoni</i> Newstead & Todd (1906)	A guenon, <i>Cercopithecus schmidtii</i>	Congo	No male mites found.
<i>Pneumonyssus griffithi</i> Newstead (1906)	<i>Macacus rhesus</i>	England	Six host individuals infested.
<i>Pneumotuber macaci</i> Hoepke (1914)	<i>Macacus rhesus</i>	Breslau, Germany	Probably a synonym of <i>griffithi</i> .
<i>Pneumonyssus foxi</i> Weidman (1915)	<i>Macacus rhesus</i>	Philadelphia, Pennsylvania	Specimen from adult male monkey. Probably a synonym of <i>griffithi</i> .
<i>Pneumonyssus congoensis</i> , new species	Dog-faced baboon, <i>Papio</i> sp.	Belgian Congo, Africa	The host was said to be a species of <i>Cynocephalus</i> . The generic name should be <i>Papio</i> .

It is noted that three of these six species came from the same type host, the common laboratory monkey, *Macacus rhesus*. Weidman (1915), when he described the last of these three, pointed out in a very clear manner the supposed differences between his *foxi* and the other species.

The chief trouble in our work with these mites has been the lack of adequate material and the lack of proper technique in studying specimens. The present writer has had no diffi-

culty in determining his material from *Macacus rhesus* as representing Weidman's species from the same host, and when a comparison is made with the descriptions of the other two species that have also been described as new from the same host there appears to be an argeement in regard to most of the characters. It is noted also that the drawings of the entire specimens are so similar to the species in hand that one is inclined to consider all species described from *Macacus rhesus* as the same. In studying these mites it is very hard to determine whether the dorsal shield is present or absent in certain specimens. The mouth-parts are so small that it is almost impossible to tell definitely whether the chelicerae are chelate or not. It is believed, also, that here we have a case where resemblances should be emphasized as much or even more than supposed differences in characters that are variable or very hard to make out. The very close agreement in a number of characters that can easily be seen and described in species from the same type host should go a long way in indicating their probable synonymy.

The genus *Pneumotuber* Hoepke, based on *Pneumotuber macaci* Hoepke, from the Rhesus monkey, must be very near to Banks's *Pneumonyssus*. If in fact the posterior tarsi are without claws in *P. macaci* the genus should be considered as good. However, specimens examined by the writer, taken from the Rhesus monkey and considered by him as being, very probably, identical with Hoepke's *P. macaci*, show the posterior tarsi with claws.

There are four species of lung mites from primates that come from different type host species, and these give every evidence of being good species. They are separated by the following key:

*Key to Species of Pneumonyssus.*

- A. Tarsal claws of second and third pairs of legs large, angulate, projecting laterally and more conspicuous than the pulvillus; abdomen of gravid females elongate and swollen and in some specimens separated from cephalothorax by transverse folds. Occurring in Ethiopian primates.
  - B. With two pairs of stigmata, abdomen in gravid females very long. Found in a guenon, *Cercopithecus schmidtii*.....  
*P. duttoni* Newstead & Todd.
  - BB. With but a single pair of stigmata; abdomen not so long in gravid females. Found in a baboon, *Papio* sp. ...*P. congoensis*, new species.
- AA. Tarsal claws of second and third pairs of legs much reduced, not angulate, not projecting laterally and less conspicuous than the pulvillus; abdomen of gravid females swollen but not elongate and never separated from cephalothorax by a transverse fold. Occurring in Oriental primates.

- B. Dorsal plate present; pulvilli constant on legs I, II and III. Occurring in *Macacus rhesus*.....*P. griffithi* Newstead.  
 BB. Dorsal plate wanting; pulvilli poorly developed in some specimens.  
 Occurring in a Javan monkey, *Cynocephalus*.....*P. simicola* Banks.

The new species from the baboon is here described, especial attention being given to those characters believed to have specific importance.

***Pneumonyssus congoensis*, new species.**

(*Adult female*.)

*Capitulum* quadrangular, about one and a half times as long as broad, with retracted chelicerae occupying most of internal space.

*Palpi* greatly reduced, in length not equal to width of capitulum; first segment very short, disclike, about three times as broad as long; second segment about half as broad as the first but slightly longer; third segment about two-thirds as broad as second segment and slightly longer than broad. This third segment is indistinctly divided about its middle and bears distally two prominent tactile setae, the outer of which is longer than the palpus itself.

*Chelicera* with two chelae, each being modified into a sharp, tapering piercer; outer chela with a prominent elbow near its base and a long, curving, lancelike distal part; inner chela smaller than outer and without the elbow.

*Dorsal plate* long, eggshaped in outline and completely covering the cephalothorax above. It is well sclerotized, extends backward past the fourth pair of coxae and bears about a dozen, short, subequal setae.

*Ventral plate* irregularly diamondshape, with three pairs of setae; first pair subapical; second pair situated just in front of lateral angles of plate near margin of same; third pair near posterior end, tips of setae themselves extending beyond tip of plate.

*Anal plate* eggshaped in outline, somewhat angulate behind; anal opening a little more than a third as wide as anal plate is broad; the two paired anal setae slightly longer than the single posterior seta, and situated slightly in front of anterior rim of anal opening.

*Spiracles* surrounded with irregularly sclerotized, bulblike walls. They are situated dorsally above the posterior coxae just under the lateral margins of dorsal plate.

*Tarsal claws* well developed, particularly those of legs II and III; first pair of tarsal claws appressed; second and third pairs large, angulate, strongly divergent; fourth pair similar to second and third pairs but smaller and less angulate.

Length of nongravid female, 0.61 mm.; width, 0.18 mm. Length of gravid female, 0.87 mm.; width, 0.36 mm.

*Type host*.—Dog-faced baboon, *Papio* sp.

*Type locality*.—Belgian Congo, Africa.

*Type slide*.—Cat. No. 994, U. S. N. M.

Described from four females (one having a larva almost com-

pletely formed in the abdomen) taken from a dog-faced baboon, *Papio* sp., March 4, 1927, by Professor J. Bequaert at Lutenga, Belgian Congo, Africa.

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### OBSERVATIONS ON THE INJURY CAUSED BY TOXOPTERA GRAMINUM ROND (HOMOPTERA: APHIDIDAE).

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*Toxoptera graminum* Rondani is much more injurious in proportion to numbers than other grain aphids. This seems to be due largely to a peculiar effect of its feeding on the leaf tissues, which has not been seen with the other species. *Rhopalosiphum prunifoliae* Fitch and *Macrosiphum granarium* Kirby have been reared and compared with *Toxoptera*. They show no such effect; plants infested by them in chimney cages have supported colonies of aphids in considerable numbers and for weeks at a time without dying. With *Toxoptera graminum* similar numbers quickly killed the plant.

Horvath (1884) described the injuriousness of *Toxoptera* and reddening of its food-plants in Hungary; Webster (1892) in

<sup>1</sup>This work was done while the writer was employed by the Minnesota Experiment Station, and is published with the approval of the Director as Paper No. 892 of the Journal Series of the Experiment Station of the University of Minnesota.